

REMARKS

The present application includes claims 1-21. Claims 1-21 were rejected by the Examiner. By this Response, claims 1-7 and 15-21 have been amended. Claims have been amended to clarify the relation to dynamic, adaptive imaging system power management.

Claims 1-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tokuyama (U.S. Patent No. 6,229,286) in view of Birleson (U.S. Patent No. 7,171,176).

The Applicant presented a nine (9) page response on November 21, 2006 (“previous response”), which is incorporated herein by reference in its entirety. In that previous response, with respect to claims 1-6 and 21, the Applicant argued that Tokuyama relates to a charging controller for charging a secondary battery as well as driving a load, such as a laptop computer. Abstract; col. 1, lines 14-19 and Figure 1. Tokuyama has a single consumption current detection circuit for measuring current from the device (e.g., a notebook computer) as a whole, as opposed to a plurality of measurement units in an imaging system measuring current in each of the corresponding particular components in the imaging system. See Figure 1 and col. 4, lines 20-39. Additionally, the Tokuyama reference lacks any mention of system or even notebook computer configuration information and certain makes no suggestion to utilize system (let alone imaging system) configuration information in a dynamic allocation of power.

With respect to claims 7-14, the Applicant submitted that Tokuyama neither measures current usage at a plurality of components in an imaging system (or any other

device or system) nor dynamically allocates power based on system configuration. See, e.g., Figure 1 and col. 4, lines 20-39.

With respect to claims 15-20, the Applicant submitted that Tokuyama does not teach or suggest that a selected imaging mode of operation, a number of components in use, current consumption for each of those components, available input current and cord current capacity limit can all be included in various combinations in a system configuration. In fact, Tokuyama fails to teach or suggest a system configuration or use of a system configuration in power allocation (let alone dynamic power allocation) at all.

Thus, Applicant respectfully submitted that the prior art of record does not teach or suggest the limitations of claims 1-21.

The Applicant thanks the Examiner for his additional search to remedy the deficiencies of Tokuyama with respect to the pending claims. However, like Tokuyama, the Birleson reference makes no mention of an imaging system or adaptive power management of imaging system components. Furthermore, Birleson relates to determining necessary signal strength (power in the sense of the Birleson patent) for generating an Intermediate Frequency (IF) signal in given environmental conditions, rather than laptop computer battery charging (as in Tokuyama). See, e.g., col. 3, lines 40-46. The Applicant respectfully submits that neither reference would have reasonably been envisioned or referenced by one of ordinary skill in the art of imaging system

development, configuration and management at the time of invention of the presently pending claims.

Birleson discusses adjusting tuner signal strength in response to information derived from the signals being processed by the tuner. See, e.g., Abstract. Power is adjusted not in response to a system configuration (and of course not with respect to an imaging system configuration, since the entire disclosure relates to radio or IF signal generation and processing) or in response to competing power constraints, but in response to environmental conditions such as noise and other interference. In the signal arts, an environment including much noise or signal interference necessitates increased signal strength to help ensure that the signal is received and processed correctly. This problem is different from adaptive power management to balance available load in an imaging system.

In Birleson, signals are used to determine an assessment of signal strength required based on method, signal count, signal strength levels, and signal types. Col. 4, line 64 – col. 5, line 20. Again, the power of Birleson is defined as signal strength, and signal strength is estimated by measuring channels or frequencies arriving at the tuner. Col. 5, lines 21-35. The Applicant submits that performance level is not a system configuration or configuration of system elements, let alone an imaging system configuration. Furthermore, the Birleson reference measures input channel information as opposed to current usage at a plurality of components in a system, let alone an imaging system.

Thus, while the Applicant submits that one would not combine the laptop battery charger of Tokuyama with the tuner of Birleson as they appear to bear no relation to each other whatsoever, such a combination would bear no relation to the imaging system power management systems and methods of the pending claims. Being able to charge a secondary battery of a laptop or notebook computer connected to a tuner fails to teach or suggest the limitations of adaptive imaging system power management recited in pending claims 1-21. Being able to charge a secondary battery for the tuner of Birleson also fails to teach or suggest the limitations of adaptive imaging system power management recited in pending claims 1-21. To help clarify the distinction, the Applicant has amended the pending claims in this response and submits that the claims represent allowable subject matter in view of the prior art of record.

The Applicant submits that, for at least the reasons described above, Tokuyama and Birleson, either taken alone or in a hypothetical combination, fail to teach or fairly suggest an adaptable power management system for dynamic current and power management in an imaging system. The references fail to teach or suggest a power management system including a plurality of measurement units for measuring current in the imaging system, each of the plurality of measurement units associated with one of a plurality of components of the imaging system to measure current in the component. The references fail to teach or suggest a main system power in the system for providing power to the imaging system for core imaging system functions; a battery charger for recharging a battery used for imaging; and a power controller for dynamically allocating power among the main imaging system power and the battery charger based on current

measurements from the plurality of measurement units and imaging system configuration information, wherein dynamic allocation and re-allocation occurs automatically based on the current measurements from the plurality of measurement units and imaging system configuration information. These limitations are recited in claim 1 of the present application.

With respect to dependent claims 2-6 and 21, the references, taken alone or in hypothetical combination, fail to teach or reasonably suggest to one of ordinary skill in the applicable art a power management system wherein the measurement unit measures at least one of current and voltage at a plurality of points in the imaging system, as recited in claim 2. Similarly, the references fail to teach or suggest a power management system wherein the power controller controls battery charging current after main system power has been allocated, as recited in claim 3. The references fail to disclose a power management system further including at least one component providing additional function in the imaging system, as recited in claim 4. The references fail to disclose a power management system wherein the power controller allocates power among the at least one component, as recited in claim 5. The references fail to teach or suggest a power management system wherein the power controller dynamically allocates power within a power limit, as recited in claim 6. The references also fail to teach or fairly suggest a power management system wherein the imaging system configuration information includes at least one of a selected imaging mode of operation, a number of components in use, component current consumption, available input current and a cord current capacity limit, as recited in claim 21.

With respect to claims 7-14, the Applicant respectfully submits that any combination of the cited references fails to teach or suggest to one of ordinary skill in the relevant art, a method for dynamic power management in an imaging system. The references fail to teach a method including measuring current input in an imaging system; measuring current usage at a plurality of components in the imaging system; and dynamically allocating power in the imaging system based on a system configuration, the current usage and the current input in the imaging system, wherein dynamic allocation occurs automatically based on the system configuration, the current usage and the current input in the imaging system. These limitations are recited in claim 7, as amended.

The Applicant submits that the combination of references fails to disclose a power management method for an imaging system wherein the measuring step further comprises measuring at least one of voltage and current at a plurality of locations in the imaging system, as recited in claim 8. The Applicant submits that the references fail to teach or suggest a power management method for an imaging system wherein the allocating step further comprises dynamically allocating power based on system usage, as recited in claim 9. The Applicant also submits that the references fail to disclose a method further including re-allocating power in the imaging system based on a change in configuration, as recited in claim 10. The combination of references also fails to teach or reasonably suggest an imaging system power management method further including re-allocating power in the imaging system based on current consumption exceeding a predefined limit, as recited in claim 11. The Applicant submits that a method for imaging system power management further including allocating available current to a battery

charger, as recited in claim 12, is neither taught nor suggested by the cited references, taken alone or in combination. The Applicant respectfully submits that the method further including maintaining at least a minimum level of power for basic imaging system functions, as recited in claim 13, is not taught or suggested by the cited art. Additionally, the Applicant submits that a power management method further including controlling an amount of current drawn by components in the imaging system, as recited in claim 14, is not disclosed in any combination of the cited art.

With respect to claims 15-20, the Applicant submits that the Tokuyama and Birleson references, taken alone or in any hypothetical combination, fail to teach or fairly suggest to one of ordinary skill in the imaging system art a power management system for dynamic current and power management in an imaging system as recited in claim 15. The system includes a power input providing power to an imaging system; at least one measurement unit for measuring current in the imaging system; and a power management controller dynamically allocating available power among components in the imaging system based on a system configuration, wherein the system configuration includes at least one of a selected imaging mode of operation, a number of imaging system components in use, imaging system component current consumption, available input current and a cord current capacity limit, wherein the dynamic allocation and re-allocation occurs automatically based on the current measurements from the at least one measurement unit and the imaging system configuration information.

As recited in claims 16, the power management controller of the power management system allows a battery for the imaging system to charge at a maximum rate

based on current consumption by the components in the imaging system. The Applicant submits that the prior art of record, even when combined in a hypothetical configuration, setting aside operational difficulties and differences in field, focus and endeavor, fails to teach or suggest the limitations recited in claim 16. Similarly, the Applicant submits that the prior art of record fails to disclose a power management system wherein the at least one measurement unit measures a voltage and a current for the power provided to the imaging system, as recited in claim 17. The prior art of record also fails to teach or suggest a power management system wherein the power management controller controls current drawn by the components in the imaging system, as recited in claim 18. Furthermore, the Applicant respectfully submits that the prior art of record fails to disclose a power management system further including a limit sensor for detecting when current consumption exceeds a certain limit, as recited in claim 19. With respect to claim 20, the Applicant submits that neither to Tokuyama nor the Birleson reference, taken alone or in combination, teaches or reasonably suggests a power management system for adaptive imaging system power management further including at least one switching unit controlled by the power management controller, wherein the at least one switching unit controls an amount of power routed to at least one component in the imaging system.

Therefore, in light of the above remarks and the amendments made to the claims, the Applicant submits that claims 1-21 should be allowable in view of the prior art of record.

CONCLUSION

The Applicant submits that the present application is in condition for allowance. If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below.

The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

Date: May 8, 2007

/Christopher N. George/
Christopher N. George
Reg. No. 51,728

McAndrews, Held & Malloy, Ltd.
500 W. Madison Street
34th Floor
Chicago, IL 60661
Phone (312) 775-8000
Fax (312) 775-8100